

REMARKS

Claim Objections

The Examiner has objected to claims 24 and 51 because they are dependent on cancelled claims. Applicant has amended claims 24 and 51 to more particularly point out and distinctly claim the subject matter which Applicant regards as the invention. As such, Applicant respectfully requests the removal of the objections to claim 24 and 51.

Claim Rejections – 35 U.S.C. § 103

Komino in view of Kimura

The Examiner has rejected claims 11-12, 14-16, 18, 21, 23, 25, 44-45 and 47-51 under 35 U.S.C. § 103(a) as being unpatentable over Komino (US Patent 5,769,952) in view of Kimura et al. (US Patent Publication 2001/0024691 A1).

It is Applicants understanding that Komino either alone or in combination with Kimura et al. fails to teach or render obvious Applicant's invention as claimed in claims 11, 14-16, 18, 21, 23, 25, 44-45, 48, 49 and 51. In claims 11, 14-16, 18, 21, 23, 25, 44-45, 48, 49 and 51, Applicant teaches and claims an apparatus for atmospheric and sub-atmospheric processing of a wafer. Applicant's atmospheric and sub-atmospheric processing apparatus includes an atmospheric transfer chamber and a sub-atmospheric transfer chamber coupled together by a load lock. Applicant's invention includes a wet cleaning module coupled the atmospheric transfer chamber. Applicant's apparatus also includes an integrated particle monitoring tool coupled to the atmospheric transfer chamber for monitoring particles on a wafer surface. Applicant's claimed invention includes a

controller for controlling the wet cleaning module and integrated particle monitoring module wherein the controller “***includes stored instructions for determining the operation of said wet cleaning module depending upon results in said integrated particle monitoring tool***”. Thus, Applicants teach and claim to control for controlling the operation of the wet cleaning module depending upon the results taken from the integrated particle monitoring tool.

Applicant does not understand either Kumino or Kimura et al. as teaching utilizing results from a particle monitoring tool to determine and control the operation of a wet cleaning module. Applicant understands Kumino to describe a reduced pressure and normal pressure treatment apparatus. Kumino fails to describe an integrated particle monitoring tool coupled to the normal pressure unit 120. Additionally and more importantly, Kumino fails to describe a controller which controls an integrated particle monitoring tool and a wet cleaning module wherein the controller provides instruction for determining the operation of the wet cleaning module depending upon results of the integrated particle monitoring tool. None of the numerous embodiments (Figures 1-6) set forth in Kumino describe the use or desire for an integrated particle monitoring tool. Although, Kumino fails to describe or suggest the use or need of an integrated particle monitoring tool, it is the Examiner’s position that it would have been obvious to include such in the apparatus of Kumino.

The Examiner cites Kimura et al. as teaching a processing in the apparatus including a particle monitoring tool and the controller for controlling a wet cleaning module in response to results found in the integrated particle monitoring tool. Applicant strongly disagrees. Kimura et al. describes a semiconductor substrate processing apparatus for forming copper interconnects on a integrated circuit. The semiconductor processing apparatus includes an atmospheric chamber having a plating module, a polishing module, a cleaning module and a measurement apparatus for measuring the initial and remainder thickness of the plated copper film. In embodiments, Kimura et al. includes recording

means for recording results of the measurement of the film thickness, the remaining film and initial film thickness of representative layers measured within the film thickness measuring section. The records of the measured thickness can be used to control the processing times of subsequent steps and data for judging the good and poor state of each of the processing steps, and whether the semiconductor substrate after completion of the interconnect formation treatment is good or poor. Kimura et al. does state that the sensor for measuring the metal film thickness can be other various sensors, such as a sensor for detecting “*substrate surface state such as the detection of the thickness of an insulating film, a sensor for the detection of the presence or absence of a metallic thin film, a sensor for detection of the presence and absence of particles on a substrate, and a sensor for recognition of pattern formed on the substrate*”. Kimura, however, fails to teach or suggest to use an integrated particle monitoring tool to scan a wafer and utilize the results from the scan to determine cleaning parameters which are to occur in a wet cleaning module. The mere suggestion that a sensor for detection of the presence and absence of particles can be included does not teach or suggest the use of a particle monitoring tool to control and set the processing parameters which are to occur in a wet cleaning module. In fact, none of the numerous embodiments set forth in Kimura (Figures 2, 13, 14, 15, 25, 31 and 32) teach, describe, show, illustrate or suggest a particle monitoring tool, where to place a particle monitoring tool and more importantly how to use a particle monitoring tool. Similarly, the process set forth and illustrated in Figure 17 fails to describe or suggest how to use of a particle monitoring tool. Accordingly, Kimura et al. clearly fails to teach or suggest a controller which includes instructions for determining the operation of the a cleaning module depending upon results taken in an integrated particle monitoring tool.

As such, since neither Kumino nor Kimura et al. alone teach or describe the use of a particle monitoring tool to determining the operation of the wet cleaning module depending upon results taken in the integrated particle monitoring tool, the combination cannot possibly teach Applicant's invention. As such, the above mentioned reasons, it is

Applicant's understanding that the combination of Kumino in view of Kimura et al. fails to teach or render obvious Applicant's invention as claimed in claims 11, 14-16, 18, 21, 23, 25, 44-45, 48, 49 and 51. Applicant, therefore, respectfully requests the removal of the 35 U.S.C. § 103 rejections of claims 11, 14-16, 18, 21, 23, 25, 44-45, 48, 49 and 51 in view of Kumino and Kimura et al. and seeks an early allowance of these claims.

Farrbairn

The Examiner has rejected claims 11, 13, 14-16, 18 and 20-25 under 35 U.S.C. § 103(a) as being unpatentable over Fairbairn et al. (US Patent Publication 2002/0155629).

Applicant, respectfully requests the removal of the rejection of claims 11, 13, 14-16, 18 and 20-25 under 35 U.S.C. § 103(a) in view of Fairbairn et al. The present Application is assigned to Applied Materials, Inc. Additionally, the Fairbairn reference is also assigned to Applied Materials, Inc. The Fairbairn et al. reference qualifies as "prior art" only under 35 U.S.C. § 102(e). Accordingly, because the subject matter and claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of Assignment to the same person and because the reference to Fairbairn et al. qualifies as "prior art" on under 35 U.S.C. § 102(e), the Fairbairn et al. reference falls under 35 U.S.C. § 103(c). As such, Applicant respectfully requests the removal of the 35 U.S.C. § 103(a) rejections of claims 1-10, 13, 14-16, 18 and 20-25 based upon Fairbairn et al.